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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MATTHIAS BOLTZE and CHRISTIAN WUNDERLICH

Appeal 2009-002243
Application 10/828,496
Technology Center 2800

Decided:¹ June 2, 2009

Before KENNETH W. HAIRSTON, MAHSHID D. SAADAT,
and CARLA M. KRIVAK, *Administrative Patent Judges*.

SAADAT, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

Appellants appeal under 35 U.S.C. § 134(a) from a Final Rejection of claims 1-3 and 5-11. Claim 4 has been canceled. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

STATEMENT OF THE CASE

Appellants' invention relates to vehicle electrical systems wherein some of the electrical power is delivered from a fuel cell to an electrical consumer without conversion by a DC/DC converter (Spec. ¶ [0001]). In particular, a fuel cell is connected to one input of the DC/DC converter so that all the useful electrical power is supplied to this input while some of the delivered power can be taken from an unconditioned output of the DC/DC converter without conversion (Spec. ¶ [0008]).

Claim 1 is illustrative of the claimed invention and reads as follows:

1. Vehicle electrical system, comprising:
 - a fuel cell auxiliary power unit and
 - a DC/DC converter for matching the DC voltage generated by the fuel cell to the voltage of the vehicle electrical system, the DC/DC having an input connected to an output of the fuel cell, a first output for delivering converted electrical power and a second output for delivering unconverted electrical power,

wherein at least one electrical consumer is connected to said second output so that some of the electrical power delivered from the fuel cell is supplied to the at least one electrical consumer without conversion by the DC/DC converter.

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

Kuwayama	US 6,125,798	Oct. 3, 2000
Raiser	US 6,177,736 B1	Jan. 23, 2001
Jungreis	US 6,881,509 B2	Apr. 19, 2005 (filed Dec. 19, 2001)
Chiao	US 7,119,454 B1	Oct. 10, 2006 (filed May 31, 2002)

Claims 1, 2, 5-8, and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Raiser in view of Jungreis.

Claims 3 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Raiser in view of Jungreis and Chiao.

Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Raiser in view of Jungreis, Chiao, and Kuwayama.²

We make reference to the Briefs (Appeal Brief filed Dec. 19, 2007 and Reply Brief filed Apr. 7, 2008) and the Answer (mailed Feb. 12, 2008) for their respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants did not make in the Briefs have not been considered and are deemed waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

ISSUE

The issue is whether Appellants have shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103. The issue on appeal turns on whether substantial evidence before us shows that, under 35 U.S.C. § 103, the combination of Jungreis with Raiser teaches or suggests the claimed subject matter.

² The final rejection of claims 1-3 and 5-11 is repeated in pages 3-5 of the Examiner's Answer.

Specifically, Appellants and the Examiner disagree as to whether the combination of Raiser and Jungreis is proper and if so, whether the combination discloses or suggests a DC/DC converter having an output for delivering unconverted electrical power.

FINDINGS OF FACT

The following findings of fact (FF) are relevant to the issue involved in the appeal.

Raiser

1. Raiser relates to a DC/DC converter for a fuel cell having an input for receiving DC power from the fuel cell and an output for providing a first DC output. (Abstract.)

2. As depicted in Figure 1, Raiser discloses a DC/DC converter 10 for receiving DC power supply input from fuel cell 12 at node 14 and providing two DC outputs V_{OUT1} and V_{OUT2} . (Col. 2, ll. 3-21; col. 4, ll. 5-16.)

Jungreis

3. Jungreis relates to a fuel cell-based power conversion system. (Col. 1, ll. 6-8.)

4. Jungreis describes the operation of the conversion system with reference to Figure 4 where a fuel stack 10' is placed directly in parallel with an energy storage device 14', which may be a battery or a capacitor. (Col. 2, l. 66 – col. 3, l. 2.)

5. Figure 4 of Jungreis shows that the output of the fuel cell stack 10' is available either as a converted DC signal on DC bus 16' after the output is converted by power converter 12A" or as an unconverted AUX

power 20' which is also stored in battery 14' to be used during transient power flow. (Col. 3, ll. 6-12.)

6. Jungreis discloses that the auxiliary power arrangement shown in Figure 4 is more efficient since no power electronics are placed between the storage device and the load (col. 3, ll. 47-49) and benefits from reduced cost and complexity (col. 3, ll. 60-67).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (stating that 35 U.S.C. § 103 leads to three basic factual inquiries: the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the art). “[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.” *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. *See In re Kahn*, 441 F.3d 977, 987-88 (Fed. Cir. 2006); *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Section 103 forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.”

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007).

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) (quoting *KSR*, 550 U.S. at 416). “One of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent’s claims.” *KSR*, 550 U.S. at 419-20.

The *KSR* Court further recognized that “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. In such circumstances, “the fact that a combination was obvious to try might show that it was obvious under § 103.” *Id.*

ANALYSIS

With respect to claim 1, the Examiner relies on Raiser for teaching a DC converter for converting the output signal of a fuel cell and outputting the first and the second converted output signals. The Examiner asserts (Ans. 4) that Raiser discloses all of the recited elements of claim 1, except for the second output delivering an unconverted signal (*id.*). The Examiner further concludes that using the fuel system of Jungreis wherein a second auxiliary output is an unconverted signal in combination with Raiser provides a more cost effective system that benefits from a simpler circuit arrangement (*id.*).

Appellants argue that Jungreis does not teach or suggest a DC/DC converter having a second output for delivering unconverted power (App. Br. 5). Appellants further assert that the proposed combination based on reduction of cost and complexity is against the teachings of Jungreis and the simple circuitry of Jungreis actually teaches away from routing the unconverted power to the load via the DC/DC converter (*id.* at 6). Appellants conclude that the Examiner's proposed modification of the references is based on impermissible hindsight and would not have been obvious to one of ordinary skill in the art (*id.* at 7).

The Examiner argues that the combination is based on the teachings of Raiser, which relates to a DC/DC converter having two outputs, in combination with Jungreis (Ans. 6). The Examiner states that while the second output of Raiser is not taught to be an unconverted signal, the converter is taught to produce two different outputs (*id.*). The Examiner also asserts that further modifying Jungreis, such that the unconverted line passes through the converter module, reduces the circuitry complexity which translates into reduced cost and increased efficiency (*id.*). By relying on Jungreis to show that the second output is an unconverted power signal, the Examiner concludes that one of ordinary skill in the art would have replaced the second output in Raiser with an unconverted signal (*id.*).

Based on our review of the references, we disagree with Appellants that one of ordinary skill would not have incorporated an unconverted output as the second output in the converter of Raiser. The converter disclosed by Raiser provides two converted output signals from the input supplied by a fuel cell (FF 1, 2). On the other hand, although the converter of Jungreis has one input and one converted output, the power system provides for a second

output that supplies an unconverted output from the fuel cell (FF 3-5). Jungreis further discloses that providing an unconverted output directly from the fuel cell reduces the amount of needed circuitry and the complexity of the design (FF 6). As such, Jungreis suggests providing an unconverted signal to the load while recognizing the benefits of a simple circuitry for reducing cost.

We also concur with the Examiner's conclusion (Ans. 6-7) that since Appellants' unconverted signal only passes through the DC/DC converter box unchanged, one of ordinary skill in the art would have perceived the boundary of the converter to be somewhat arbitrary. While the Examiner's reasoning has merits based on the desirability of having a single converter unit that provides two outputs, we follow the principles outlined in the *KSR* holding and conclude that the modification would have been obvious to one of ordinary skill in the art. In that regard, we find that one of ordinary skill in the art would have used a known solution, such as providing an unconverted output signal, as suggested by Jungreis, as one of the two outputs of the converter in Raiser. Similarly, we find that using the unconverted output of Jungreis, such that an auxiliary unconverted power may be available to be provided both to the load and to the storage device, is no more than the predictable use of a known element according to its established function of designing simpler circuitry.

Additionally, we also disagree with Appellants' argument (Reply Br. 3, 4) that the combination of the disclosures of Raiser and Jungreis would render the AC/DC converter of Raiser inoperative. In that regard, as articulated in the *KSR* decision, one of ordinary skill in the art faced with the design need for a converter unit that provides two outputs, would have

selected among known available conversion schemes, such as the unconverted second output signal disclosed by Jungreis, since it is among the finite number of identified, predictable ways that the converter outputs may be designed and the “person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *KSR*, 550 U.S. at 421. Therefore, we do not find error in the Examiner’s position with respect to the combination of the applied references and sustain the 35 U.S.C. § 103(a) rejection of claim 1, as well as claims 2, 5-8, and 11, which are argued together with claim 1 (App. Br. 7), over Raiser and Jungreis.

Regarding claims 3, 9, and 10, Appellants rely (App. Br. 7-8) on the same arguments presented for claim 1, which we found to be unpersuasive. In view of our analysis above, we find that the teachings of Raiser and Jungreis in combination with Chiao and Kuwayama, when considered as a whole, support the Examiner’s 35 U.S.C. § 103 ground of rejection. Thus, we sustain the 35 U.S.C. § 103(a) rejection of claims 3 and 9 over the teachings of Raiser, Jungreis, and Chiao, and of claim 10 over the teachings of Raiser, Jungreis, Chiao, and Kuwayama.

CONCLUSION

Because Appellants have failed to point to any error in the Examiner’s position that one of ordinary skill in the art would have combined Raiser and Jungreis and if so, whether the combination discloses or suggests a DC/DC converter having an output for delivering unconverted electrical power, we sustain the 35 U.S.C. § 103 rejections of claims 1-3 and 5-11.

ORDER

The decision of the Examiner rejecting claims 1-3 and 5-11 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. 1.136(a)(1)(iv).

AFFIRMED

babc

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